KING & SPALDING LLP

# SOIL SCREENING ISSUES

## Presentation to US EPA,

## June 16, 2006

# Chronology of Key Events – Herculaneum Site

- 2001 - Quality Assurance Project Plan: composite soil samples from the "upper 1 inch of soil" (Page 7)
- 2003 - Technical Report for Focus Group Recommendations - "Surface scraping samples are a more sensitive indicator of contamination of the replaced soil by lead dust and were instituted by the EPA in Herculaneum during 2003." (Page 11)

# Chronology of Key Events – Herculaneum Site (cont'd)

- March 16, 2004 - Herculaneum City Meeting: Bruce Morrison, EPA Region VII: top ⅛ to ¼ inch of soil (personal communication to A. Miller)
- December 22, 2004 – Transmittal Memorandum from Jim Luey and Rob Elias, Technical Review Workgroup: upper 0.25 inches

# Implications

December 29, 2005 letter from Robert Geller, MO DNR, to Dan Vornberg:

"...the DNR has periodically updated and refined its analysis of the EPA's re-deposition data upon receipt of new data. These statistical analyses of the re-deposition data indicate significant residential soil recontamination is occurring within 0.75 mile of Doe Run's Herculaneum smelter. Our analyses indicate residential soils within the Herculaneum VPPP area and areas beyond will be recontaminated to unacceptable levels within relatively short periods of time."

# December 22, 2004 TRW Memo

"We agree with the position that is included in your request (attached):

> *EPA contends that surface soil collected from any portion of the upper 1 inch horizon, as long as sample aliquots for a single composite sample are taken from the same depth interval, is representative of a surface soil sample that will provide data that is suitable for evaluating human health risk using the IEUBK model."*

# December 22, 2004 TRW Memo (cont'd)

"We agree with the position that is included in your request (**attached**):

> *EPA contends that surface soil collected from* ***any portion of the upper 1 inch horizon****, as long as sample aliquots for a single composite sample are taken from the same depth interval,* ***is representative of a surface soil sample that will provide data that is suitable for evaluating human health risk using the IEUBK model.***"

[Attachment was not provided; nor has it been provided in response to a FOIA request.]

# TRW Memo

- "This position is consistent with..."
  - (1) LSW Handbook (EPA, 2003; OSWER #9285.7-50)
  - (2) Technical Background Document to the 1996 Soil Screening Guidance (EPA, 1996c; EPA/540/R-96/018) [Background Document is EPA/540/R95/128 (May 1996)]
  - (3) TRW Guidance for Shooting Ranges (EPA, 2003; OSWER #9285.7-37)
  - (4) RAGS Part A (EPA, 1989; EPA/540/1-89/002)

# (1) LSW Handbook (Superfund Lead-Contaminated Residential Sites Handbook, Aug. 2003)

"With respect to risk assessment, the top inch of soil best represents current exposure to contaminants ... and is the source of data used in the IEUBK model to represent exposure from soil." (Page 26)

# (2) Technical Background to the 1996 Soil Screening Guidance

"Sample Depth: When measuring soil contamination levels at the surface for the ingestion and inhalation pathways, the top 2 centimeters is usually considered surface soil, as defined by Urban Soil Lead Abatement Project (U.S. EPA 1993f)." (Page 84)

# (2) Technical Background Document (cont'd)

Table 21: "Sampling Soil Screening DQOs for Surface Soils: Define the Study Boundaries: Surface soils (usually the top 2 centimeters, but may be deeper where activities could redistribute subsurface soils to the surface." (Page 83)

# (3) TRW Guidance for Shooting Ranges (2003)

"Sampling depth should be appropriate for the exposure scenario(s) that are to be considered in the risk assessment. Typically, this will dictate that samples be collected from the surficial soils (i.e., 0-1" depth interval) to assess current exposure scenarios. To assess the risk for future exposures it may be appropriate to also collect samples at depth." (Page 7, document not numerically paginated.)

# (4) RAGS Part A (Interim Final, 1989)

"Depth of samples. Sample depth should be applicable for the exposure pathways and contaminant transport route of concern and should be chosen purposively within that depth interval. If a depth interval is chosen purposively, a random procedure to select a sampling point may be established. Assessment of surface exposures will be more certain if samples are collected from the shallowest depth that can be practically obtained, rather than, for example, zero to two feet." (Page 4-12)

# Key Language in RAGS Part A

- "Assessment of surface exposures will be more certain if samples are collected from **the shallowest depth that can be practically obtained**, ***rather than, for example, zero to two feet***."
- "shallowest depth that can be practically obtained" or "rather than, for example, zero to two feet"?

# Other EPA References to Soil Screening Levels

- K. Hogan et al. – IEUBK validation
- EPA website "Frequent Questions from Risk Assessors on the IEUBK Model (current as of June 2006)
- Urban Soil Lead Abatement Demonstration Project (cited in TRW Memo reference 2 – Technical Background Document to Soil Screening Guidance)
- 1996 Soil Screening Guidance: User's Guide

# IEUBK Validation

- From K. Hogan et al., *Integrated Exposure Uptake Biokinetic Model for Lead in Children: Empirical Comparisons with Epidemiologic Data*, Env. Health Persp., vol. 106, 1557-1567 (Dec. 1998):
- Table 2, which summarizes "environmental sampling methods and choice of IEUBK model inputs, from three community blood lead studies,1991":

# IEUBK Validation (cont'd)

- Palmerton: "The average of the bare and play areas was judged to be as similar to the composite measurements from the other two as possible." (Page 1560)
- Final Risk Assessment Report for Palmerton (1998): "All soil samples were collected from the surface to a depth of 2 centimeters (about 1 inch) and included the litter layer." (Page 2-6)
- "composite of ≥ 10 one-inch soil cores from play areas" (Madison County, IL, Galena, KS/Jasper County, MO) (source: Table 2)

# Contrast: IEUBK validation uses "one-inch soil cores"

... with the TRW Memo: "We agree with the position that is included in your request (attached):

> *EPA contends that surface soil collected from* ***any portion of the upper 1 inch horizon****, as long as sample aliquots for a single composite sample are taken from the same depth interval, is* ***representative of a surface soil sample that will provide data that is suitable for evaluating human health risk using the IEUBK model."***

# Frequent Questions from Risk Assessors on the IEUBK Model

- http://www.epa.gov/superfund/programs/lead/ieubkfaq.htm (last updated April 19, 2006)
- "What sampling depth is most representative of surface soil and dust that is associated with exposure (both direct contact and incidental ingestion) of children?"

# Frequent Questions from Risk Assessors on the IEUBK Model (cont'd)

"EPA has recommended the collection of surface soil from the top two centimeters (zero- to one-inch) of the soil layer for use in baseline risk assessments (see the 1996 Soil Screening Guidance on the EPA Superfund Soil Screening Guidance Web page). The Technical Review Workgroup for Metals and Asbestos (TRW) agrees that this depth best represents the soil and dust exposure for use in calculation of the predicted child blood lead level using the IEUBK model as well as characterization of the MSD [mass fraction of soil in indoor dust]."

# From Urban Soil Lead Abatement Demonstration Project

"Soil sampling procedures were defined based on agreement that five 2-cm soil cores would be taken according to a prescribed pattern about a randomly selected point, and that a prescribed number of these points would be selected based on the size and shape of the plot of soil." (Report at 3-1.) (Final version, April 1996, EPA/600/AP-93/001aF, cited in reference 2. Review Draft version is the same, at 1-9.)

# Soil Screening Guidance: User's Guide (9355.4-23, July 1996)

- The depth over which surface soils are sampled should reflect the type of exposures expected at the site. The Urban Soil Lead Abatement Demonstration Project ... defined the top 2 centimeters as the depth of soil where direct contact predominantly occurs. The decision to sample soils below 2 centimeters depends on the likelihood of deeper soils being disturbed and brought to the surface (e.g., from gardening, landscaping or construction activities.)" (Page 12)

# Other Region VII Soil Sampling

- Work Plan for Viburnum Trend Haul Roads Site (July 11, 2005): "At each aliquot location, a small area will be excavated down to approximately 1 inch into the topsoil."
- Work Plan for Interim Action, St. Francois County Mine Tailings Sites (May 2004): "At each aliquot location, a small area will be excavated with a clean trowel or trier down to approximately 1 inch into the topsoil."

# Other Region VII Soil Sampling (cont'd)

- Work Plan for Removal Preliminary Assessment and Site Inspection (Viburnum Site):
  - "Sampling methodology is based on EPA (2003) Superfund Lead-Contaminated Residential Sites Handbook."
  - "At each aliquot location, a small area will be excavated down to approximately 1 inch into the topsoil."

# Other Region VII Soil Sampling (cont'd)

Omaha: "Each aliquot will be collected from the top one-inch of soil away from the influences of the house's drip zone." (Source: Region VII contractor Black & Veatch, Field Sampling Plan)

# Concerns

- The change from a 1" core sample to "surface scraping" or "any portion of the upper 1 inch horizon": (1) represents a significant change in policy, (2) is contrary to extensive precedent throughout the agency and within Region VII, and (3) was done without public participation and a meaningful opportunity to comment.
- The new policy is scientifically questionable and at odds with its stated goal to "provide data that is suitable for evaluating human health risk using the IEUBK model."